Porphyry deposits associated with adakitic (high Sr/Y) magma in subduction zones, Mongolia

O. GEREL[1*], B. BATKHISHIG[1], B. MUNKHTSENGEL[1], A. CHIMEDTSEREN[1]

[1] Mongolian University of Science & Technology, Baga Toiruu 34, Ulaanbaatar 14191, Mongolia. (*correspondence: gerel@must.edu.mn

Major porphyry deposits in Mongolia associated with subduction zones: island arc and magmatic arc link with high Sr/Y adakitic magmas [1]. The genesis of adakitic magmas is debatable with interpretation of their origin of (1) slab melting, (2) lower crust melting or (3) fractional crystallization of amphibole-garnet and assimilation of mid- to lover crustal rocks. [2, 3]

We studied large porphyry deposits of Paleozoic –Mesozoic age in Mongolia. Clear adakitic signatures demonstrate only magmatic rocks associated with the Devonian Tsagaan Suvarga and Carboniferous Shuteen Cu-Au deposit, and for them origin due partial melting of subducted oceanic crust is acceptable. [3]

The Oyu Tolgoi volcanic rocks are typical arc suites, and only mineralized monzodiorite and granodiorite are represented by high Sr/Y rocks. No typical tholeiiitic rocks, all rocks are calc-alkaline, and only some basalts show alkaline signatures. If all these rocks are mainly arc related, but high Sr/Y mineralized rosks should be point to possible association with adakitic magma. Magmatic rocks associated with above mentioned porphyry Cu-Au-Mo deposits are mainly calc-alkaline, medium to high K, I type, metaluminous, highly (Oyu Tolgoi, Erdenet, Bayan uul) or moderately (Shuteen) oxidized. Granitoids are depleted in Nb, enriched in LILE, and LREE, typical VAG, and with agakitic signature (high Sr/Y, La/Yb, low Y and Yb). In Central and North Mongolia volcanic andesitic rocks formed in the environment were mature continental crust developed, and volcanic K-Na suites of basalt-andesite calc-alkaline series have very variable composition, with high Al_2O_3, medium and high MgO, high Zr, Sr, and Cr and Ni. Volcanic rocks with elevated Zr leads us to believe that part of them developed in the rift or postsubduction environment.

[1] Gerel et al (2013) The 8th International forum on strategic Technology. **V.1**.MUST, 537-542. [2] P.R. Castillo (2006) *China Science Bulletin* **51**, 3, 257-268. [3] Richards & Kerrich (2007) *Economic Geology*, **102.** 537-576.